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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
RODRIGUEZ, GLENDA P	
ART UNIT	**PAPER NUMBER**
2697	

DATE MAILED: 08/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/993,778	HEYDARI ET AL.	
	Examiner	Art Unit	
	Glenda P. Rodriguez	2697	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *3/29/2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 February 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1, 2, 3, 6, 7, 9, 10, 13, 14, 16, 19 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Fisher et al. (US Patent No. 5, 384, 671).

Regarding Claim 1, Fisher et al. teach a servo circuit, comprising:

A synchronous partial response maximum likelihood servo channel operable to recover servo data from servo wedges that identify respective data sectors on a data-storage disk (See Abstract);

And a processor coupled to and operable to control the servo channel (Col. 13, Lines 27-33).

Regarding Claim 13, Fisher et al. teach a disk-drive system, comprising:

A data-storage disk having a surface, data sectors at respective locations of the surface, and servo wedges that each include respective servo data that identifies the location of a respective data sector; a motor coupled to

and operable to rotate the disk (Col. 6, Line 52-60 and Col. 4, Lines 31-33);

A read head operable to generate a read signal that represents the servo data, the read head having a position with respect to the surface of the data-storage disk (Col. 2, Lines 34-43 and Col. 4, Lines 46-50);

A read-head positioning circuit operable to move the read head over the surface of the disk (Col. 4, Lines 33-37);

And a servo circuit coupled to the read head and to the read-head positioning system, the servo circuit including, a synchronous servo channel operable to recover the servo data from the servo wedges (Col. 2, Lines 34-39 and Col. 4, Lines 33-37);

And a processor coupled to and operable to control the servo channel (Col. 13, Lines 27-33).

Regarding Claim 14, Fisher et al. a method, comprising:

Reading a data-storage disk having a surface and having servo sectors disposed on the surface, the servo sectors including servo data (Col. 2, Lines 34-43 and Col. 4, Lines 46-50);

And synchronously recovering the servo data from the servo sectors with a partial-response-maximum-likelihood-detection algorithm (Col. 2, Lines 40-47. It is

inherent that if it uses a partial-response-maximum-likelihood-detection, it has an algorithm that makes the program do that type of detection.).

Regarding Claim 2, Fisher et al. teach all the limitations of Claim 1. Fisher et al. also teach wherein:

The servo channel is operable to receive a servo-data sample clock (Col. 13, Line 64 to Col. 14, Line 4. Fisher teach that the timing circuit resynchronizes with the servo address marks (SAM), which is a part of a servo sector.);

And the servo channel comprises a digital timing-recovery loop operable to synchronize the sample clock to the servo data (Col. 12, Lines 5-17. The timing loop synchronizes the detected data.).

Regarding Claims 3 and 16, Fisher et al. teach all the limitations of Claim 1 and 14, respectively. Fisher et al. also teach wherein:

The servo channel is operable to receive a servo signal that represents the servo data, the servo signal having an amplitude (See Abstract and Col. 3, Lines 48-53. Fisher et al. teach that the servo sectors provide the synchronization data used for the servo sector in order to be synchronized.);

And the servo channel comprises a digital gain-recovery loop operable to adjust the gain of the servo signal to a

target (Col. 12, Lines 5-17. Fisher et al. teach that the digital gain loop adjusts any error or bias and even offset that may have occurred during the readback of the servo signal.).

Regarding Claim 6, Fisher et al. teach all the limitations of Claim 1. Fisher et al. further teach wherein the servo channel includes a Viterbi detector operable to recover the servo data from the servo wedges (Fig. 4, Element 50 and Col. 11, Lines 26-31).

Regarding Claim 7, Fisher et al. teach all the limitations of Claim 1. Fisher et al. further teach wherein the servo channel includes a decoder operable to decode the recovered servo data (Col. 11, Lines 26-31. Fisher et al. also teach that the Viterbi detector also decodes the data.).

Regarding Claim 9, Fisher et al. teach all the limitations of Claim 1. Fisher et al. also teach wherein the processor is operable to detect one of the servo wedges during or after disk spin-up search operation without first detecting a spin-up wedge (Col. 15, Line 64 to Col. 16, Line 6. Fisher et al. teach that the controller is able to detect the servo bursts areas as they are read by the read head.).

Regarding Claim 10, Fisher et al. teach all the limitations of Claim 1. Fisher et al. further teach a disc drive comprising an interface circuit operable to couple the recovered servo data to and receive data from a circuit external to the servo circuit (See Fig. 4, wherein Fisher et al. teach a head disc assembly (HAD, Element 12) with a preamplifier circuit (Element 28) and a

servo circuit placed separately in an electronic circuit board (PCB, Element 14).).

Regarding Claim 19, Fisher et al. teach all the limitations of Claim 14. Fisher et al. further teach further comprising decoding the recovered servo data (Fig. 4, Element 50 and Col. 11, Lines 26-31. Fisher et al. also teach that the Viterbi detector also decodes the data.).

Regarding Claim 23, Fisher et al. teach all the limitations of Claim 14. Fisher et al. further teach synchronously recovering spin-up data from a spin-up wedge that is disposed on the surfaced of the data-storage disk (Col. 2, Lines 34-39 and Col. 4, Lines 33-37. It is inherent that the servo sectors have a specific wedge that indicates the head's position throughout the disk.).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 4, 5, 8, 11, 17, 18, 20, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fisher et al. (US Patent No. 5, 384, 671) in view of Tuttle et al. (US Patent No. 6, 108, 151).

Regarding Claim 11, Fisher et al. teach all the limitations of Claim 1. Fisher et al. fail to teach wherein the synchronous servo channel is operable to detect spin-up wedges on the data-storage disk during a spin-up search

operation. However, this feature is well known in the art as disclosed by Tuttle et al., wherein it teaches a servo channel that is operable to detect spin-up wedges on the data-storage disk during a spin-up search operation (Pat. No. 6, 108, 151; Col. 15, Lines 13-30). It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify Fisher et al.'s to detect servo wedges while performing a spin-up operation in order for the medium to be able to locate asynchronously the positions of the head in the disk surface.

Regarding Claims 4 and 17, Fisher et al. teach all the limitations of Claims 1 and 14, respectively. Fisher et al. fail to teach further comprising: sampling the servo data with a sample clock; calculating an initial phase difference between the sample clock and the servo data; and using the initial phase difference to facilitate synchronizing the sample clock to the servo data. However, this feature is well known in the art as disclosed by Tuttle et al, wherein it teaches the servo data being sampled (Pat. No. 6, 108, 151; Col. 8, Line 48-49. It is obvious that if sampling is involved, there is a clock frequency in the medium.), a phase error detector that computes sample values from a generator and acquires samples from the servo signal by acquisition (Pat. No. 6, 108, 151; Col. 12, Lines 56-62) and computes the sampling phase error (Pat. No. 6, 108, 151; Col. 13, Lines 17-30). It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify Fisher et al.'s invention in order for the medium to be able to correct the phase error between the clock and the servo

data in order to minimize the initial phase error between the sampling rate and the acquisition rate.

Regarding Claims 5 and 18, Fisher et al. teach all the limitations of Claims 1 and 14, respectively. Fisher et al. fail to teach generating a servo signal that represents the servo data; calculating an initial difference between the amplitude of the servo signal and a predetermined amplitude; and using the initial difference to facilitate adjusting the amplitude of the servo signal toward the predetermined amplitude. However, these features are well known in the art as disclosed by Tuttle et al., wherein it teaches sampling of the servo data (Pat. No. 6, 108, 151; Col. 8, Line 48-49), a servo gain circuit that computes the gain error of the signal and a slicer that estimates the value of the detected signal (Pat. No. 6, 108, 151; Col. 11, Lines 10-14). It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify Fisher et al.'s invention in order to reduce the gap between the sectors.

Regarding Claims 8 and 20, Fisher et al. teach all the limitations of Claims 1 and 14, respectively. Fisher et al. fail to teach further comprising asynchronously demodulation a servo-position burst from the servo data. However, this feature is well known in the art as disclosed by Tuttle et al., wherein it teaches an asynchronous servo position demodulator (Pat. No. 6, 108, 151; Col. 20, Lines 27-38). It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify Fisher et al.'s invention because is more efficient for sampled amplitude read

channels and further reduces the duplication of the corresponding portions of the Integrated Circuits.

Regarding Claims 21 and 22, Fisher et al. teach all the limitations of Claim 14. Fisher et al. fail to teach further comprising: Asynchronously detecting a servo wedge while or after the disk rotates from a first to a steady-state speed; And reading the servo data from the detected servo wedge to determine an initial position of a read head with respect to the surface of the disk. However, this feature is well known in the art as disclosed by Tuttle et al., wherein it teaches a asynchronous servo wedge detector that it detects the position of the head in the media during a spin up operation until a steady-state speed (Pat. No. 6, 108, 151; Col. 15, Lines 23-30. It is obvious to a person of ordinary skill in the art to know that if the medium is able to detect the position of the track during a spin up operation, it will also detect during a steady-state speed. Another reason is because the servo track determines the sampling speed of the medium, so it is obvious that the medium will be able to detect the servo bursts during steady-state speed.). It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify Fisher et al.'s to detect servo wedges while performing a spin-up operation in order for the medium to be able to locate asynchronously the positions of the head in the disk surface.

5. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fisher et al. (US Patent No. 5, 384, 671) in view of Satoh et al. (US Patent No. 5, 818, 655). Fisher et al. teach all the limitations of Claim 1. Fisher

et al. fail to teach wherein a servo channel includes an analog-to-digital converter operable to convert an analog pr4-equalized servo signal into the digital domain. However, this feature is well known in the art as disclosed by Satoh et al., wherein it teaches a an analog-to-digital converter that changes the pr4 equalized signal into the digital domain (Pat. No. 5, 818, 655; Col. 12, Lines 38-49). It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify Fisher et al.'s invention in order for the medium to be able to convert the data with the analog-to-digital converter using a partial response class IV scheme because it permits higher data density in the disk.

6. Claim I5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fisher et al. (US Patent No. 5, 384, 671) in view of Bliss. (Patent No. 6, 032, 284). Fisher et al. teach all the limitations of Claim 14. Fisher et al. fail to teach generating a servo signal that represents the servo data; sampling the servo signal; and synchronizing a sample clock to the servo data by interpolating the values of the sample clock. However, these features are well known in the art as disclosed by Bliss, wherein it teaches a read back device that read and samples a read signal (Pat. No. 6, 032, 284; Col. 6, Line 12-13. It is obvious to a person of ordinary skill in the art that in the readback signal the medium reads servo data and user data and samples and converts it to a signal.), and an interpolator that synchronizes the data (Pat. No. 6, 032, 284; Col. 7, Lines 14-21). It would

have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify Fisher et al.'s invention in order for the medium to be able to interpolate the sampled data in order to be synchronized to the channel of the current zone.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents are cited to further show the state of the art with respect to Servo Circuit Having a Synchronous Channel and Method for Synchronously Recovering Servo Data:

    a) Pat. No. 5, 844, 741 to Yamakawa et al., wherein it teach a PRML readback channel.

    b) Pat. No. 6, 084, 741 to Kim, wherein it teaches a synchronous PRML method in a magnetic disk.

    c) Pat. No. 5, 872, 666 to Saiki et al., wherein it teaches a synchronous PRML with disk sectors.

    d) Pat. No. 6, 108, 153 to Glover, wherein it teaches a synchronous PRML channel with servo demodulators.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Glenda P. Rodriguez whose telephone number is (703)305-8411. The examiner can normally be reached on Monday thru Thursday: 7:00-5:00; alternate Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on (703)308-4825. The

fax phone numbers for the organization where this application or proceeding is assigned are (703)308-6743 for regular communications and (703)308-6743 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-9000.

GPR

gpr
August 4, 2003

Andrew S. Knight